

## Contributors to This Issue

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JACK A. BAIRD, B.S.E.E., 1943, Texas A. & M. College; M.S., 1950, Stevens Institute of Technology; Ph.D. (Electrical Engineering), 1952, Texas A. & M. University; Bell Telephone Laboratories, 1946—. Mr. Baird has worked on the development of military radar and communications systems, with particular emphasis on the application of transistors and other solid-state devices. He is currently Vice President, Network Planning and Customer Services, of Bell Laboratories. In this position he is responsible for the system planning of the Bell System network and the planning and development of customer services and equipment. Fellow, IEEE.

E. CRAIG BENNER, B.S.E.E., 1964, Syracuse University; M.S.E.E., 1966, University of California at Los Angeles; Bell Telephone Laboratories, 1966—. At Bell Laboratories, Mr. Bender has derived simulation procedures for submarine tracking, automatic equalization, and radio fading. He is currently involved with the study and planning of wide-band data services. Member, Eta Kappa Nu, Tau Beta Pi.

CHARLES BREEN, E.E., 1930, Cornell University; American Telephone and Telegraph Company Long Lines Department, 1930-1938; Bell Telephone Laboratories, 1938-1970. Mr. Breen's early Bell Laboratories work included maintenance studies and formulation of requirements for toll and local switching systems. During World War II he was engaged in the development of military radar and microwave communications. From 1953 until his retirement in August 1970, he headed departments responsible for PBX, Key Telephone Systems, Signaling, and Special Service Projects. This work included responsibility for Systems Engineering work on the complete Bell System line

of modern electronic and electromechanical PBX systems. This work has also included planning of Centrex, *Picturephone*®, and other new PBX service features, and special systems for hospitals, motels and telephone answering customers. Member, Eta Kappa Nu.

CHARLES W. BRODERICK, B.S.E.E., 1961, University of Buffalo; M.E.E., 1963, New York University; Bell Telephone Laboratories, 1961—. Mr. Broderick has been engaged in microwave device development for satellite use and improvement of the TD-2 Radio System. He is currently working on digital transmission over microwave radio. Member, IEEE, Tau Beta Pi, Eta Kappa Nu.

DONALD W. BROWN, B.S.E.E., 1962, University of Louisville; M.S.E.E., 1964, New York University; Bell Telephone Laboratories, 1962—. Mr. Brown's initial work at Bell Labs has included circuit and logic design in the development of trunks and peripheral circuits for the No. 101 ESS. He was also engaged in program development for the 50A test position in the No. 2 ESS AUTOVON project. Currently, he is engaged in circuit and program design for the No. 101 ESS wideband switch unit.

H. E. BROWN, B.S. (E.E.), 1956, University of Rhode Island; M.S. (E.E.), 1961, Stevens Institute of Technology; Bell Telephone Laboratories, 1956—. Mr. Brown's initial assignment involved feasibility studies of alternative ways to employ electronic switching offices to serve low-density population areas. He later assumed responsibility for engineering studies on PCM Channel Banks (D1 and D2) and digital transmission lines using paired cable (T1 and T2). These studies included performance standards, maintenance arrangements, field evaluation, and reliability surveys. Following this, his responsibilities shifted to transmission studies related to *Picturephone*® service, including planning for the evolution of the network, establishing overall performance objectives and engineering of local video loops and trunks. More recently, he has been engaged in economic and performance studies of new telephone stations, both public and residence sets. He is presently Head of the Station Studies Department.

JAMES M. BROWN, B.S.E.E., 1957, M.S.E.E., 1958, and Ph.D.E.E., 1964, Polytechnic Institute of Brooklyn; Bell Telephone Laboratories, 1958—. Mr. Brown has worked on the design of the lineless telephone, the *Bellboy*® personal radio signaling system, the design of a hybrid

network with a dynamically balanced matching impedance, and the subscriber loop multiplexer system. He is presently Supervisor of a group responsible for the design of a subscriber loop video transmission system for *Picturephone*® service. Member, I.E.E.E., Eta Kappa Nu, Sigma Xi.

BARRY J. BUNIN, B.E.E., 1963, Cooper Union; M.S., 1964, University of Pennsylvania; Ph.D., 1970, Polytechnic Institute of Brooklyn; Bell Telephone Laboratories, 1963–1966, 1968—. Mr. Bunin has been concerned with analog transmission problems of the *Picturephone*® visual telephone system. He is presently studying digital encoding and transmission of video signals. Member, IEEE, Eta Kappa Nu.

PAUL N. BURGESS, B.S.E.E., 1963, University of Wisconsin; MScEE, 1965, Ohio State University; Bell Telephone Laboratories, 1963—. Mr. Burgess has been engaged in circuit and system development for the No. 5 crossbar switching system. Since 1968, he has been Supervisor of a group responsible for the circuit design of audio and video switching networks and automatic message accounting (AMA) equipment for the No. 5 system. Member, Eta Kappa Nu.

WILLIAM B. CAGLE, B.S.E.E., 1953, University of Oklahoma; Bell Telephone Laboratories, 1953—. Mr. Cagle was initially involved in logic circuit and control unit design for No. 1 ESS. In 1964, he was appointed Head of a department which was subsequently concerned with the development of mobile telephones, and *Picturephone*® station sets. He is presently Director of the Telephone and *Picturephone* Planning Center, which is responsible for planning features, systems, and station set requirements for new telephone and *Picturephone* services. Member, IEEE, Tau Beta Pi, Sigma Tau, Eta Kappa Nu, Phi Eta Sigma.

THEODORE V. CRATER, B.S.E.E., 1947, Montana State College; M.S.E.E., 1949, California Institute of Technology; Ph.D., 1953, Northwestern University; Bell Telephone Laboratories, 1953—. In his earlier years, Mr. Crater worked primarily on engineering of the T1 Carrier System repeatered line. Since 1961 he has been involved in the planning of systems for *Picturephone*® service. At present he is in charge of a group concerned with digital transmission of the visual telephone signal and with provision of the image in color. Member, IEEE.

ANDREW DASKALAKIS, B.S.E.E., 1957, Drexel University; M.E.E., 1959, New York University; Bell Telephone Laboratories, 1957—. Mr. Daskalakis' initial assignments were in the design of circuits for the 3A Speakerphone System including conferencing arrangements. Later he contributed to the development of the Two-Way Dial MJ Mobile Radio Telephone System for use primarily in automobiles. He has supervised a group that developed a Dial Telephone System for the high-speed "METROLINER" Train and proposed a plan for a high-capacity Mobile Telephone System. Presently he supervises a group responsible for the development of all *Picturephone*® Key Systems. Member, Phi Kappa Phi, Tau Beta Pi, Eta Kappa Nu.

IRWIN DORROS, S.B. and S.M. (Electrical Engineering), 1956, Massachusetts Institute of Technology; Eng. Sc.D. (Electrical Engineering), 1962, Columbia University; Bell Telephone Laboratories, 1956—. Mr. Dorros has worked on electronic switching, data communications and digital transmission development projects and on transmission systems engineering programs. He is currently Director of the Facilities Network Planning Center. Member, IEEE.

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DAVID L. FAVIN, B.S.E.E., 1950, Moore School of the University of Pennsylvania; S.M.E.E., 1952, Massachusetts Institute of Technology; Bell Telephone Laboratories, 1952—. Mr. Favin has been developing field test equipment which include microwave sweepers, envelope delay distortion measuring sets, random data signal generators, noise measuring equipment and echo suppressor measuring sets. He currently supervises a group engaged in designing time domain transmission measuring equipment. He holds sixteen patents in circuit design. Member, IEEE Electro-Acoustic Committee, Eta Kappa Nu, Sigma Xi, Sigma Tau, Tau Beta Pi.

JOHN F. GILMORE, B.S.E.E., 1958, Polytechnic Institute of Brooklyn; M.E.E., 1961, New York University; Bell Telephone Laboratories, 1958—. Mr. Gilmore has worked on the design of traffic measurement circuits, loop and trunk maintenance arrangements, transmission test lines and SMAS No. 1A. He is currently supervising a group engaged in the development of new maintenance access arrangements. Member, Eta Kappa Nu, Sigma Xi, Tau Beta Pi.

ALAN M. GORDON, Sch. (Engineering), 1957, Brown University; M.S.E.E., 1959, New York University; Bell Telephone Laboratories, 1957—. Mr. Gordon has done development work on the *Touch-Tone*® dialing system, *Picturephone*® station sets, and tantalum thin-film circuits and facilities. He currently is Supervisor of the *Picturephone*® Receiver Group. Member IEEE, Tau Beta Pi.

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JOHN R. HORVATH, B.E., 1962, and M.S., 1963, Rutgers University; Bell Telephone Laboratories, 1963—. At Bell Labs, Mr. Horvath has been engaged in development work on the No. 101 and No. 2 Electronic Switching Systems. At present he is involved with programming the No. 101 ESS to provide *Picturephone*® service. Member, IEEE, Tau Beta Pi, Eta Kappa Nu, Pi Mu Epsilon.

R. D. HOWSON, B.E., 1959, M.E., 1960, and D.E., 1967, Yale University; Bell Telephone Laboratories, 1962—. Mr. Howson has been engaged in the development of wideband data communication sys-

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H. I. MAUNSELL, B.S., 1950, University of the Witwatersrand, Johannesburg, South Africa; Bell Telephone Laboratories, 1957—. For several years Mr. Maunsell worked on the terminal equipment, test sets and protection switching circuits for the TH microwave radio relay system. He later became concerned with communication circuits for the *Telstar*® satellite, subsequently supervising the group responsible for the design of the satellite ground station transmitter. From 1965 to 1968, he was involved with studies of radio system performance with regard to digital transmission. He has since been actively associated with codec development.

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R. E. OLSEN, S.B. and S.M., 1965, Massachusetts Institute of Technology; Bell Telephone Laboratories, 1965—. In addition to work on *Picturephone*® signal transmission, Mr. Olsen has performed field measurements of L-multiplex equipment and economic studies of long-haul transmission facilities. He is currently engaged in system engineering studies of short-haul carrier facilities for use in urban areas. Member, IEEE.

THORNTON S. PAXTON, B.S.E.E., 1963, Brigham Young University; M.S.E.E., 1965, Massachusetts Institute of Technology; Bell Telephone Laboratories, 1963—. Mr. Paxton has been associated with various aspects of No. 101 ESS development. Initially he was engaged in logic design for the 4A SU. He was later concerned with some programming aspects of call processor trouble switching routines and then was associated with peripheral unit maintenance in the No. 2 ESS AUTOVON project. More recently he was jointly responsible for the organization and teaching of the Indian Hill Technology Course for new technical employees and for teaching logic and switch-

ing in the GSP program. He is presently responsible for the attendant call processing program to provide video service in the No. 101 ESS. Member, Tau Beta Pi, Illinois Society of Professional Engineers.

E. B. PETERSON, B.S.M.E., 1948, Cornell University; M.S.I.E., 1954, Stevens Institute of Technology; Bell Telephone Laboratories, 1950—. Mr. Peterson was initially involved in development of electromechanical equipment for NIKE and TERRIER military missile systems. He later served in various personnel and staff positions. In 1960, he rejoined the technical area to supervise a group concerned with reliability studies of military systems. He supervised the Environmental Laboratory operations for *Telstar*® in 1962 and the following year assumed his current responsibilities supervising the local switching systems and special projects maintenance engineering group. Member, Cornell Engineers, IEEE.

G. W. PHIPPS, B.S. (E.E.), 1960, Rose Polytechnic Institute; M.S. (E.E.), 1963, New York University; Bell Telephone Laboratories, 1961—. Mr. Phipps initially worked on data station engineering for both line-switched and store-and-forward data systems. He then became involved in studies of communications for business information systems, primarily in the use of CRT terminals for real-time information retrieval. He is now Supervisor of a group responsible for computer-access planning for *Picturephone*® service. Member, IEEE, Tau Beta Pi.

J. S. RONNE, B.S. (Physics), 1954, and M.A. (Physics), 1955, Oregon State University; Bell Telephone Laboratories, 1955—. Mr. Ronne initially worked on the design and analysis of transistor and magnetic core circuits for analog and digital computers in connection with military defense computer research programs. More recently he has been engaged in the system and circuit design of wideband digital transmission terminals. Member, Sigma Xi, IEEE, Sigma Pi Sigma, Pi Mu Epsilon.

MARSHALL G. SCHACHTMAN, B.S. and M.S. in E.E., 1958, Massachusetts Institute of Technology; Bell Telephone Laboratories, 1955—. After early work on a new low-current telephone subscriber's set, Mr. Schachtman was engaged in designing circuits for use in test equipment for Radio Relay Systems. He later was involved in systems engineering work on TASI and on system studies of the use of lasers in

communications. He continued his systems engineering work on SD submarine cable systems and on studies of methods for improving the performance of HF radio telephone systems. He then began working on the early phases of studies for transmission maintenance of *Picturephone*® service. He has supervised a group working on systems studies of analog video telephone transmission and currently is Supervisor of a group studying advanced transmission maintenance techniques for *Picturephone* service. Member, IEEE, Eta Kappa Nu, Tau Beta Pi.

JOHN B. SINGLETON, B.S. (Physics), 1952, Holy Cross; M.S. (Physics), 1954, University of Rhode Island; Bell Telephone Laboratories, 1954—. Mr. Singleton has worked on the development of numerous semiconductor devices ranging from point contact diodes to integrated circuits. He currently is Head of the Integrated Circuits Department. Senior Member, IEEE; Member, Electromechanical Society, Sigma Xi.

JAMES E. STICKEL, B.E.E., 1963, Georgia Institute of Technology; MScEE, 1965, Ohio State University; Bell Telephone Laboratories, 1963—. Mr. Stickel was primarily concerned with the physical design of the wideband network during the initial phases of the *Picturephone*® development. He now supervises a group responsible for the equipment design of central office trunks for the No. 5 crossbar system. Member, Eta Kappa Nu.

REMBERT R. STOKES, B.S.M.E., 1953, Clemson University; M.S., 1966, Butler University; Bell Telephone Laboratories, 1953—. Mr. Stokes has been involved in the design of card dialers, automatic reporting telephones, public coin telephone apparatus and the laminated coinage for the U. S. Government. Beginning in 1966, he supervised the physical design of the Mod II *Picturephone*® Station Set and the 50A Conference Set. He is presently Head of the Physical Design of Telephones Department and holds 19 patents in this field. Member, ASME, Tau Beta Pi, Phi Kappa Phi.

JOSEPH F. URICH, B.E.E., 1959, Manhattan College; M.S.E.E., 1962, New York University; Bell Telephone Laboratories, 1959—. Mr. Urich has worked on systems engineering of signaling and switching systems. Formerly Supervisor of the *Picturephone*® Switching Studies Group, he now supervises a group performing special studies of local switching systems for data applications.



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